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May 2, 2017

VIA ELECTRONIC FILING

Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: ViaSat Inc., Notice of *Ex Parte* Presentation
WC Docket Nos. 10-90, 14-58, 07-135, 05-337, and 03-109; GN Docket No. 09-51; CC Docket Nos. 01-92 and 96-45; WT Docket No. 10-208

Dear Ms. Dortch:

On Friday, April 28, 2017, Paul Milgrom of Auctionomics and I met with the Commission staff members listed below on behalf of ViaSat Inc. Chris Murphy, Associate General Counsel, Regulatory Affairs of ViaSat, participated by phone.

The purpose of the meeting was to discuss suggestions for structuring the upcoming CAF II reverse auction. The enclosed presentation materials, which have been updated to address some questions that arose during the meeting, formed the basis for the conversation.

Please feel free to contact me or any of the other ViaSat participants if you have any follow up questions or comments.

Respectfully submitted,

/s/
John P. Janka
Counsel to ViaSat Inc.

cc: Kirk Burgee
Chelsea Fallon
Michael Janson
Katie King
Evan Kwerel
Paul LaFontaine
Heidi Lankau
Eliot Maenner
Alexander Minard
Kerry Murray
Kathryn O'Brien
Thomas Parisi
Martha Stancill
Margaret Wiener

CAF II: BETTER SERVICE TO MORE AREAS

April 28th, 2017

ViaSat

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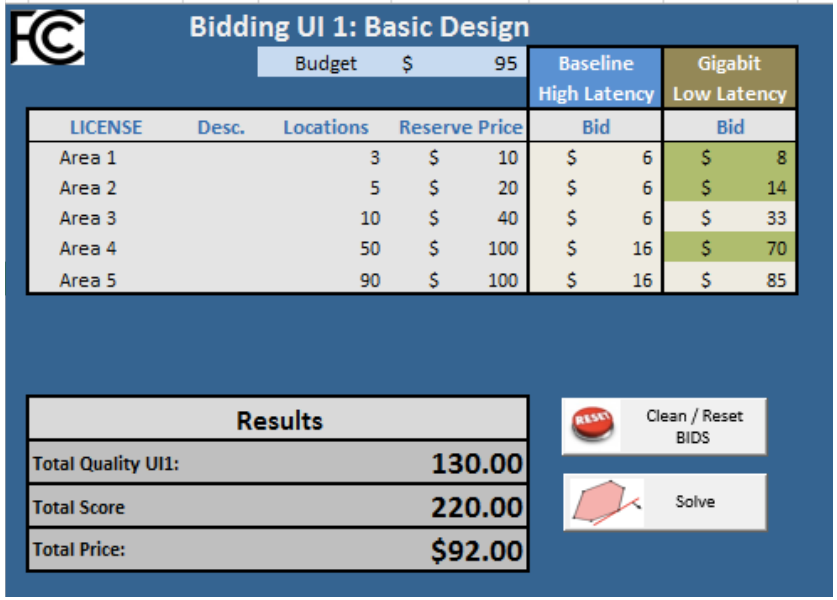
An Easy but Flawed Design

- For each region, the lowest scoring bid is selected, using the possible scoring in the FCC's Report and Order: $S = 100 \times B/R + T + L$.
- Regionally winning bids are ranked from lowest to highest and funded sequentially until the budget is exhausted.



Bidding UI 1: Basic Design

Budget $ 95

LICENSE	Desc.	Locations	Reserve Price	Baseline High Latency Bid	Gigabit Low Latency Bid
Area 1		3	$ 10	$ 6	$ 8
Area 2		5	$ 20	$ 6	$ 14
Area 3		10	$ 40	$ 6	$ 33
Area 4		50	$ 100	$ 16	$ 70
Area 5		90	$ 100	$ 16	$ 85

Results	
Total Quality UI1:	130.00
Total Score	220.00
Total Price:	$92.00

Clean / Reset BIDS

Solve

The values in this example and the succeeding examples are offered for illustrative purposes only; they do not represent estimates of actual bids.

In this example of the basic design, only 58 of 158 locations are selected and served by the Gigabit / Low Latency provider; **100 locations remain unserved**, despite artificially low Baseline bids.

For the cost of the Gigabit / Low Latency service for areas 1 and 2, the Baseline / High Latency provider could provide service to 100 locations.

- **Fast** and **easy to implement** in either sealed-bid or descending auction formats, but ***no coherent objective is maximized***.

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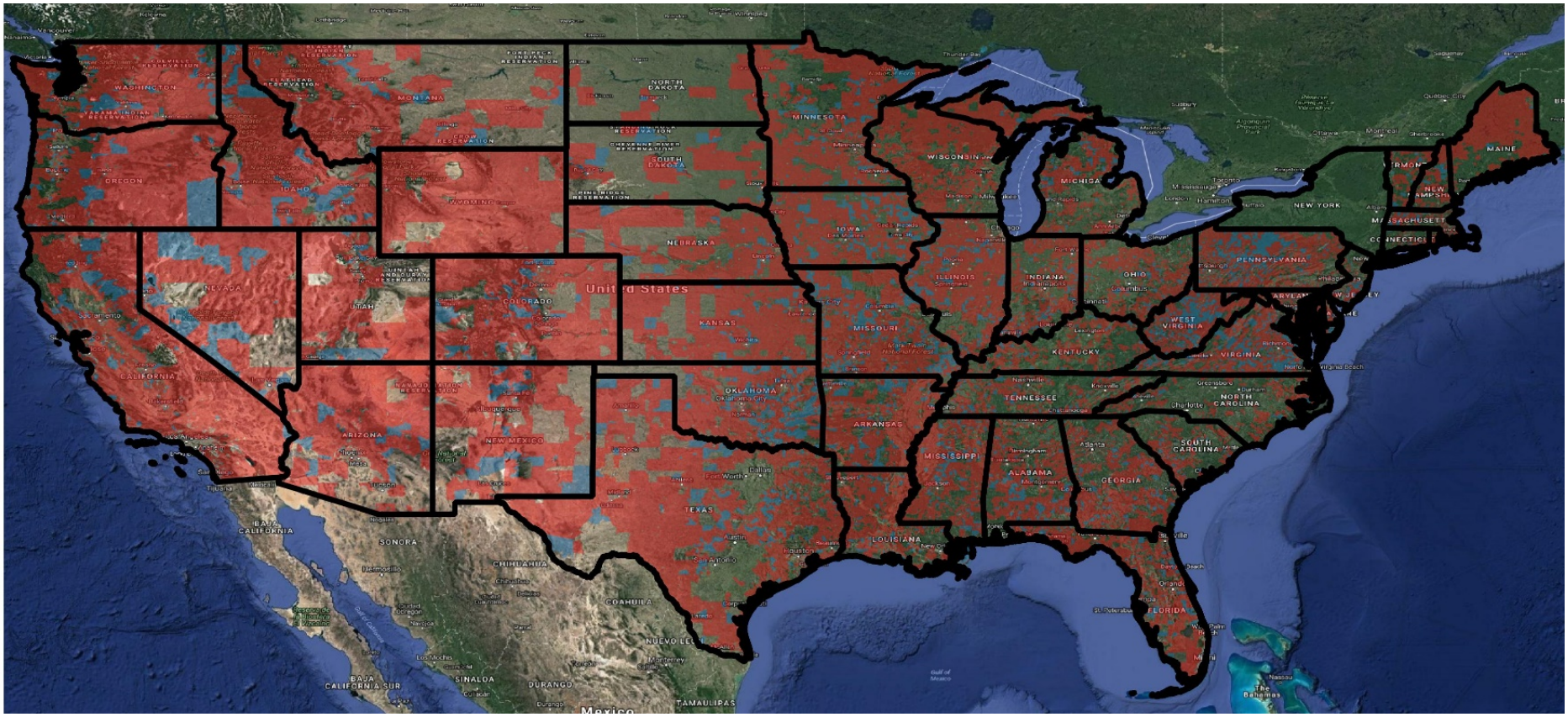
Possible Consequence: Reduced and Unequal Coverage



■ Not funded ■ Fiber

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Two Simple Improvements

Two changes to the basic design could help the FCC achieve a more equitable outcome given a tight budget:

1

Alternative Winner Determination

Maximize total quality, subject to budget. The total quality objective implicitly includes coverage.

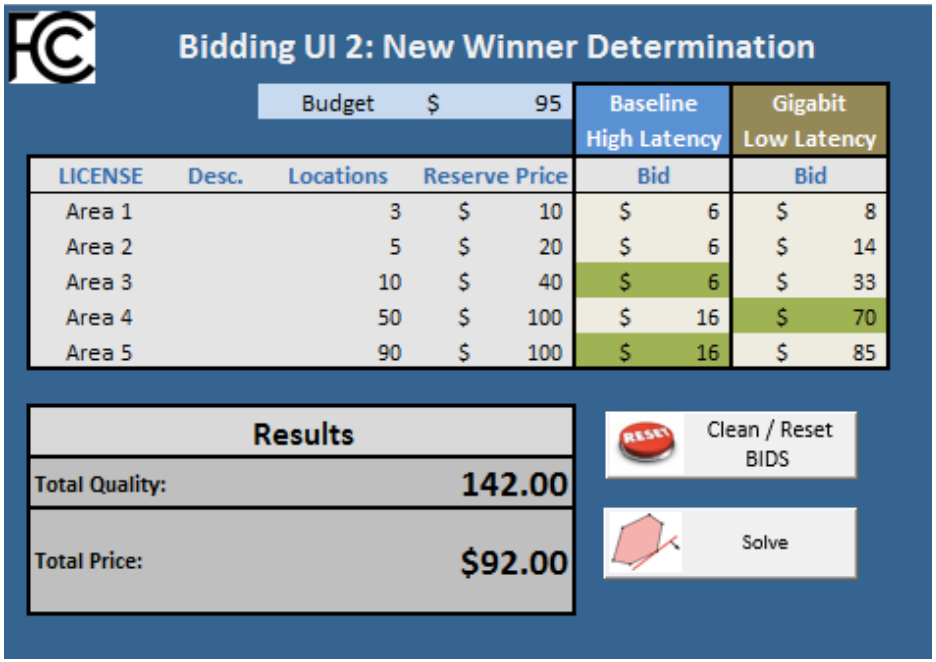
2

Limited Package Bids

Keep bidding simple, but recognize the important role of **shared infrastructure** for many services

Improvement #1: Credit for Coverage

- Each bid is assigned a **quality score**, using the performance and latency tiers from the FCC's Report and Order: $Q = R \times (100 - T - L)$.
- Winners are determined by **maximizing total quality, subject to the budget constraint**



Using the same bids but this alternative winner selection rule, the **largest three regions are served** (150 of 158 locations) and **50 locations still receive Gigabit / Low Latency service**.

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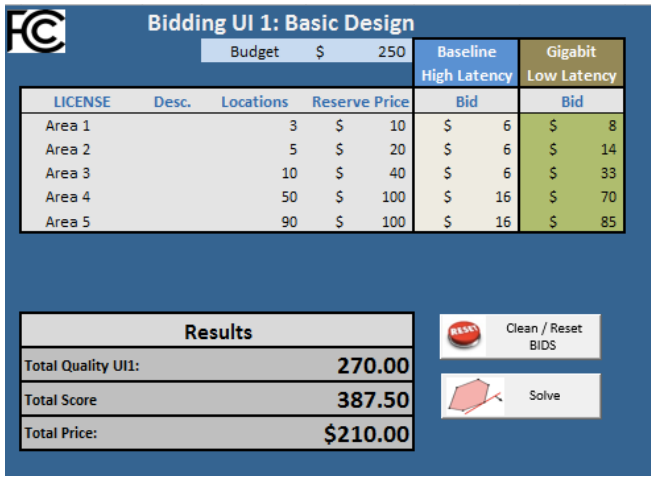
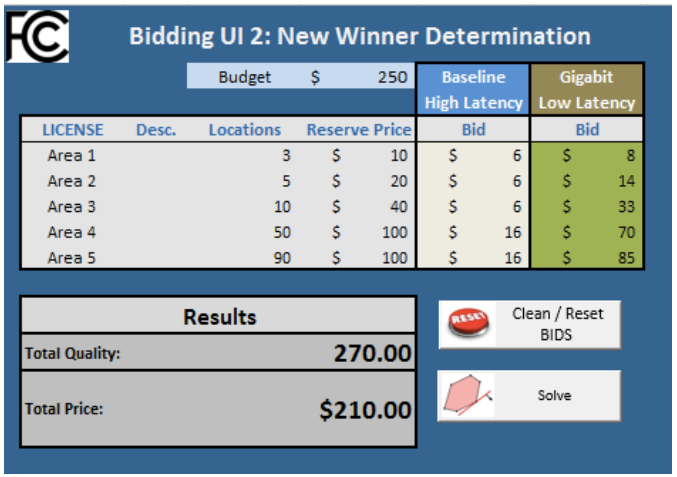
Credit for Coverage: A Fair Trade

- With a large enough budget, the simple and improved designs often produce the same outcome: *Gigabit service is selected in all regions*.

Two rules: same bids win





- However, if the budget is limited, the proposed auction rule allows a trade-off between **higher quality** in some areas for **more CBGs covered**.
- Baseline / High Latency service can replace Gigabit / Low Latency service only at a ratio of *at least* **10 : 3**.
  - One region of Gigabit / Low is preferred to three comparable regions of Baseline / High
  - But four regions of Baseline / High are preferred to one comparable region of Gigabit / Low

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Alternative Clock Auction

- If the budget is tight, then the following simple clock auction would lead to similar results.
  - A single clock quotes a price per unit of quality, which is initially 100.
  - Quality is defined by $Q = R \times (100 - T - L)$.

- Auction algorithm
  1. Bidders indicate whether they are still willing to supply each CBG at the stated prices. (A bidder can change from "yes" to "no," but not reversely.)
  2. If the total cost of supply exceeds the FCC's allotted budget, then all prices are reduced by (say) 5%, and the process returns to step 1.
  3. If the total cost of supply is less than the FCC's allotted budget, then prices are reduced by (say) 5% only for the CBGs with excess supply, and the process returns to step 1.
     - Supply offers cannot be reduced for a CBG unless its price is reduced.
     - "Intra-round bidding" or a tie-breaking rule may be applied.

+ Improvement #2: Limited Package Bids

- Adding a second improvement: in addition to providing marginal costs for each region, bidders can also assign bids to a **group**.
- For each group, a bidder can specify a **fixed cost** (to be paid if *any* bid within the group is selected) and a **group capacity constraint**.
  - ViaSat has previously proposed this design in a filing to the FCC.

Bidding UI 3: New Winner Determination with Groups

					Budget	$	95	Baseline High Latency		Gigabit Low Latency	
LICENSE	Desc.	Locations	Reserve Price					Bid	Group	Bid	Group
Area 1		3	$	10				$ 1	1	$ 8	None
Area 2		5	$	20				$ 1	1	$ 14	None
Area 3		10	$	40				$ 1	1	$ 33	None
Area 4		50	$	100				$ 1	2	$ 70	None
Area 5		90	$	100				$ 1	2	$ 85	None

Results	
Total Quality:	151.00
Total Price: (inc. Fixed costs)	$94.00

Clean / Reset BIDS

Solve

Baseline / High Latency

Group	Fixed Cost	Capacity
None	0	160
1	5	160
2	15	160

The Baseline / High provider can more accurately express its costs, so its marginal bids are much lower.
All regions are served, with 50 regions still receiving Gigabit / Low service.

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A Flexible Design

This proposed design is robust and flexible to other desired adjustments:

Further **policy constraints** can be included in the optimization, without any changes for bidders

The design can easily be adapted to run as a **dynamic** descending price auction

Lamborghinis for the Select Few? Chevys for Everyman? Or an *Optimal Mix*!

- Our proposed winner selection rule absolutely *prioritizes low-latency, high tier service*.
  - If the budget were ample relative to bids, Gigabit / Low Latency service would always win, even against zero-cost Baseline / High Latency service.
  - With a tighter budget, the rule would trade away ***more than 3⅓*** Baseline / High Latency-served locations to serve one similar location with Gigabit / Low Latency fiber service.

- Adding the possibility of a fixed cost bid improves efficiency and makes low marginal bids for CBGs much safer, *greatly expanding the number of locations served*.